UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/797,297 | 03/09/2004 | Ajith Kuttannair Kumar | 20-LC-2057-2 | 4437 |

23413 7590 01/24/2008

CANTOR COLBURN, LLP
20 Church Street
22nd Floor
Hartford, CT 06103

| EXAMINER | |
|---|---|
| JEN, MINGJEN | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3664 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 01/24/2008 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/797,297 | KUMAR, AJITH KUTTANNAIR | |
| | Examiner | Art Unit | |
| | Ian Jen | 3664 | |

***-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --***

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on _31 October 2007_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) _1-32_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-32_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _03/29/2204_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _03/09/2004_.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

1. This action is in response to the communication filed on 10/31/2007

2. Claims 1-20 are pending in the application.

3. Applicant submitted terminal disclaimer on 10/31/2007 has not been approved for the appropriated fee has not been submitted.

### *Response to Argument*

**1.** Applicant's arguments with respect to claims 1- 32 have been considered but are moot in view of the new ground(s) of rejection.

### *Double Patenting*

4. nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969). The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re*

*Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

5. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting The g ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-3, 5-32 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-10, 11, 13, 14, 16-19 of U.S. Patent No 6,728,606.

As for claim 1, Patent 6,728,606 shows a method for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase, wherein traction motor signal is responsive to an operating condition of traction motor in an electrically unexcited state; processing traction motor signal to create an indication result based on a frequency of traction motor signal; and determining rotational velocity of traction motor based on indication result (Claim 1).

As for claim 2, Patent 6,728,606 shows the method of claim 1, a vehicle data signal (Claim 16).

As for claim 3, Patent 6,728,606 shows vehicle includes an additional traction motor, and vehicle data signal includes a reference speed signal responsive to a rotational velocity of additional traction motor ( Claim 9, where the reference speed signal is the indication result and the magnitude of two phase signal is the rotational velocity of additional traction motor; Fig 1; It

would be obvious to one of ordinary skill in the art to place multiple traction motor in order to drive multiple locomotive wheel).

As for claim 5, Patent 6,728,606 shows processing traction motor signal includes proceeding with processing responsive to vehicle data signal (Claim 16).

As for claim 6, Patent 6,728,606 shows converting traction motor signal into a two-phase signal responsive to traction motor signal (Claim 1).

As for claim 7, Patent 6,728,606 shows applying two-phase signal to phase locked loop (PLL) circuitry so as to create a PLL signal responsive to the frequency of two-phase signal (Claim 2).

As for claim 8, Patent 6,728,606 shows processing PLL signal so as to create a two-phase unity signal responsive to the frequency of PLL signal (Claim 3).

As for claim 9, Patent 6,728,606 shows combining unity signal and two-phase signal so as to create indication result (Claim 4).

As for claim 10, Patent 6,728,606 shows comparing unity signal with two-phase signal so as to determine the frequency error of two-phase signal (Claim 5).

As for claim 11, Patent 6,728,606 shows indication result is responsive to the frequency of unity signal (Claim 6).

As for claim 12, Patent 6,728,606 shows indication result is responsive to the frequency of two-phase signal (Claim 7).

As for claim 13, Patent 6,728,606 shows processing traction motor signal includes determining the magnitude of two-phase signal (Claim 8).

As for claim 14, Patent 6,728,606 processing includes creating indication result wherein indication result is responsive to the magnitude of two-phase signal (Claim 9).

As for claim 15, Patent 6,728,606 shows processing traction motor signal includes isolating a single phase of traction motor signal (Claim 10).

As for claim 16, Patent 6,728,606 shows processing traction motor signal includes applying single phase of traction motor signal to a rectifier so as to create a rectified signal (Claim 11).

As for claim 17, Patent 6,728,606 shows processing traction motor signal includes applying rectified signal to a low pass filter so as to create an indication result responsive to the magnitude of single phase of traction motor signal (Claim 18).

As for claim 18, Patent 6,728,606 shows processing traction motor signal includes processing single phase of traction motor signal so as to create indication result responsive to the magnitude of single phase of traction motor signal (Claim 13).

As for claim 19, Patent 6,728,606 shows processing traction motor signal includes determining the time between predefined signal event occurrences so as to create an indication result responsive to the frequency of signal phase of traction motor signal (Claim 14).

As for claim 20, Patent 6,728,606 shows processing traction motor signal includes processing traction motor signal so as to create indication result responsive to the frequency of traction motor signal (Claim 19).

As for claim 21, Patent 6,728,606 shows processing traction motor signal includes calculating indication result using Fourier analysis, wherein indication result is responsive to the magnitude and frequency spectrum of traction motor signal (Claim 14).

As for claim 22, Patent 6,728,606 shows processing traction motor signal includes obtaining a vehicle data signal and applying single phase of traction motor signal to a band pass filter so as to create a band pass output signal responsive to vehicle data signal (Claim 16).

As for claim 23, Patent 6,728,606 shows processing traction motor signal includes applying band pass output signal to a signal rectifier so as to create a rectified signal (Claim 17).

As for claim 24, Patent 6,728,606 shows processing traction motor signal includes applying rectified signal to a low pass filter so as to create indication result wherein indication result is responsive to the magnitude and frequency of single phase of traction motor signal (Claim 18).

As for claim 25, Patent 6,728,606 shows rotational velocity of traction motor is indicative of a velocity of vehicle. (Claim 8, Claim 25 is identical in scope compare to claim 8 of Patent 6,728,606 even though the wording between the claims is slightly different. Note, "The magnitude of two-phase signal" would be the same as the indicative of a velocity of vehicle. This is a double patenting rejection).

As for claim 26, Patent 6,728,606 shows traction motor is connected to an axle of vehicle and the method further comprises determining if a locked axle condition exists (Claim 10, Claim 26 is identical in scope compared to claim 10 of Patent 6,728,606 even though the wording between the claims is slightly different. Note, the traction motor is the driving means for the axle of vehicle and is attached with one another; " examining indication results so as to determine if locked axle condition exist" would be the same as the method to determine if a locked axle condition exists. This is a double patenting rejection).

As for claim 27, Patent 6,728,606 shows determining at least one of: determination of speed of vehicle, vehicle adhesion control, vehicle speed control, and wheel diameter determination based on indication result. (Claim 18, Claim 27 is identical in scope compared to claim 18 of Patent 6,728,606 even though the wording between the claims is slightly different. Note, the indication result is examined to determine if the locked axle condition exists by its magnitude and frequency of single phase of traction motor which relates to speed and wheel diameter determination to be determined. This is a double patenting rejection).

As for claim 28, Patent 6,728,606 shows traction motor signal is based on a voltage generated by a residual flux in traction motor when rotated by movement of vehicle. (Claim 19,

Claim 28 is identical in scope compared to claim 19 of Patent 6,728,606 even though the wording between the claims is slightly different. Note, the traction motor voltage is generated by movement of vehicle and is identical to the traction motor signal, which is voltage, respond to the operating condition of traction motor, which causes the movement of vehicle. This is a double patenting rejection).

As for claim 29, Patent 6,728,606 shows a data storage medium including instructions encoded in a computer readable form for causing a computer to implement a process for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase, wherein traction motor signal is responsive to an operating condition of traction motor in an electrically unexcited state; processing traction motor signal to create an indication result responsive to a frequency of traction motor signal; and determining rotational velocity of traction motor based on indication result (Claim 1, Claim 29 is identical in scope compared to claim 1 of Patent 6,728,606 even though the wording between the claims is slightly different. It would be obvious to one of ordinary skill in the art to place motor signal from unexcited state to excited state, which is from non-input delivered to input delivered for the control system in order to activate system and to place the computer encoded instruction inside computer to execute computer control systems. This is a double patenting rejection).

As for claim 30, Patent 6,728,606 shows a computer data signal encoded in a computer readable medium, data signal comprising code configured to direct a computer to implement a process for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase, wherein traction motor signal is responsive to an

operating condition of traction motor in an electrically unexcited state; processing traction motor signal to create an indication result responsive to a frequency of traction motor signal; and determining rotational velocity of traction motor based on indication result (Claim 1, Claim 30 is identical in scope compared to claim 1 of Patent 6,728,606 even though the wording between the claims is slightly different. Furthermore, it would be obvious to one of ordinary skill in the art to place the computer encoded instruction inside computer to execute computer control systems. This is a double patenting rejection).

As for claim 31, Patent 6,728,606 shows a computer processor on a vehicle for performing a process for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase, wherein traction motor signal is responsive to an operating condition of traction motor in an electrically unexcited state; processing traction motor signal to create an indication result responsive to a frequency of traction motor signal; and determining rotational velocity of traction motor based on indication result (Claim 1, Claim 31 is identical in scope compared to claim 1 of Patent 6,728,606 even though the wording between the claims is slightly different. Furthermore, it would be obvious to one of ordinary skill in the art to place the computer encoded instruction inside computer to execute computer control systems. This is a double patenting rejection).

As for claim 32, Patent 6,728,606 shows a system for detecting a rotational velocity of a traction motor in a vehicle comprising: a traction motor generating a traction motor signal having at least one phase, wherein traction motor signal is responsive to an operating condition of traction motor in an electrically unexcited state; a voltage sensor configured to generate a signal indicative a voltage generated by residual flux in traction motor when rotated by movement of

vehicle with traction motor in an electrically unexcited state; and a controller in operable communication with at least one of traction motor and voltage sensor configured to process traction motor signal and signal, and thereby create an indication result responsive to a frequency of traction motor signal and indicative of rotational velocity of traction motor (Claim 1, Claim 32 is identical in scope compared to claim 1 of Patent 6,728,606 even though the wording between the claims is slightly different. Furthermore, it would be obvious to one of ordinary skill in the art to place the computer encoded instruction inside computer to execute computer control systems. This is a double patenting rejection).

7. Claim 4 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,728,606 in view of Balch et al, U.S. Patent No 6,758,087.

As for claim 4, Patent 6,758,087 shows, Balch vehicle data signal includes a reference speed tolerance. (Claim 6, where reference speed to be limited with an upper and lower limit, which is speed tolerance).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1- 2, 5-15, 25-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Obara et al (US Pat NO. 5,661,380) in view of Becerra ( Four Quadrant Sensorless Brushless ECM Drive ; CH2992-6/91/0000-0202, IEEE).

As for claim 1, Obara et al shows a method for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase, wherein traction motor signal is responsive to an operating condition of traction motor ( Column 3, lines 42- 47; Column 4, lines 40- Col 5, lines 25; Fig 1; Speed Sensor 6 which obtain the motor input signal which respond to motor 4 in two outputs 6a, 6b ); processing traction motor signal to create an indication result based on a frequency of traction motor signal ( Column 3, lines 63 - Column 4, lines 13; Fig 1, primary frequency command generating means 20; alternating current command generating means 80, PWM signal generating means 90 ); and determining rotational velocity of traction motor based on indication result ( See Fig 1, three phase alternating current motor 4, speed sensor 6, current sensor 7, accelerator sensor 8, rotating angular speed detecting means 10; Column 3, lines 30 -50 ). Obara et al in view of Balch does not show motor signal is responsive to motor in an electrically unexcited state. Becerra shows motor signal is responsive to motor in an electrically unexcited state (Col 1, Introduction, where the sensor is utilized to measure the EMF voltage in motor unexcited phase).

It would have been obvious for one of ordinary skill in the art to provide the EMF voltage measurement, which exhibited in unexcited phase, as the feedback trigger signal as taught by Becerra, to Obara et al in view of Balch, to provide a rotational velocity detection method.

As for claim 2, Obara et al shows obtaining a vehicle data signal (See Fig 1, primary frequency command generating means 20, vector control calculating means 50, alternating current command generating means 80, PWM signal generating means 90 where provides reference feed back signal accordingly to the vehicle condition alone with standard signal Eu, Ev, Ew; column 3, lines 51 - column 4, lines 17).

As for claim 5, Obara et al shows processing traction motor signal includes proceeding with processing responsive to vehicle data signal (See Fig 1, current control means 70; Fig 2, Column 3, lines 17 -19; Column 5, lines 37 -41; Column 5, lines 54 - 62; Column 5, lines 64 - Column 6, lines 7).

As for claim 6, Obara et al shows converting traction motor signal into a two-phase signal responsive to traction motor signal (See Fig 1, speed sensor 6a, 6b; Column 4, lines 18 - 22).

As for claim 7, Obara et al shows processing includes applying two-phase signal to phase locked loop (PLL) circuitry so as to create a PLL signal responsive to the frequency of two-phase signal (See Fig 2, Fig 4; Column 4, lines 37 - 47; Column 7, lines 35-44).

As for claim 8, Obara et al shows processing further includes processing PLL signal so as to create a two-phase unity signal responsive to the frequency of PLL signal( See Fig 1; Fig 2; Column 5, lines 35 - 47; Column 7, lines 20 -34).

As for claim 9, Obara et al shows processing further includes combining unity signal and two-phase signal so as to create indication result (See Fig 1; Fig 2; Column 5, lines 35 - 47; Column 7, lines 20 -34).

As for claim 10, Obara et al shows determining includes comparing unity signal with two-phase signal so as to determine the frequency error of two-phase signal (See Fig 1; Fig 2; Column 5, lines 35 - 47; Column 7, lines 20 -34).

As for claim 11, Obara et al shows indication result is responsive to the frequency of unity signal( See Fig 1; Fig 2; Column 5, lines 35 - 47; Column 7, lines 20 -34).

As for claim 12, Obara et al shows indication result is responsive to the frequency of two-phase signal( See Fig 1; Fig 2; Column 5, lines 35 - 47; Column 7, lines 20 -34).

As for claim 13, Obara et al shows processing traction motor signal includes determining the magnitude of two-phase signal (See Fig 3, Magnitude comparator; Column 5, lines 33-34).

As for claim 14, Obara et al shows processing includes creating indication result wherein indication result is responsive to the magnitude of two-phase signal( See Fig 2, Fig 3, magnitude comparator, voltage utilization improving circuit 74 where the input voltage magnitude is compared and modified before used for generating the PWM signal; Column 6, lines 50-60 ).

As for claim 15, Obara et al does not show processing traction motor signal includes isolating a single phase of traction motor signal.

Becerra show processing traction motor signal includes isolating a single phase of traction motor signal (Col 1, Introduction, where only two of the three phases motor is excited, left a single phase of motor isolated).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by providing at least one phase of traction motor signal of Becerra as a reference in order to complete the feedback control loop system.

As for claim 25, Obara et al shows rotational velocity of traction motor is indicative of a velocity of vehicle( Column 1, lines 15 -35; Column 2, lines 40-41; Column 3, lines 30 -45 where the speed sensor detects the current and rotating speed of the motor and the motor serve as driving mean for vehicle).

As for claim 26, Obara et al shows traction motor is connected to an axle of vehicle and the method further comprises determining if a locked axle condition exists (Abstract; Column 1, lines 15 -35; Column 2, lines 40-41; Column 7, lines 45 - 48 where locked axle conditions exists while sensor failure).

As for claim 27, Obara et al shows determining at least one of: determination of speed of vehicle, vehicle adhesion control, vehicle speed control, and wheel diameter determination based on indication result (Column 2, lines 1-19 where the speed reference can used for locked axle indication, speedometer, adhesion control, cruise control, wheel diameter calibration utilizing control system design an sensor design).

As for claim 28, Obara et al shows traction motor signal is based on a voltage generated by a residual flux in traction motor when rotated by movement of vehicle ( Column 4, lines 41 - Column 5, lines 35).

As for claim 29, Obara et al shows a data storage medium including instructions encoded in a computer readable form for causing a computer to implement a process for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase, wherein traction motor signal is responsive to an operating condition of traction motor (Column 3, lines 42- 47; Column 4, lines 18-22; Fig 1; Speed Sensor 6 which obtaining motor input signal which respond to motor 4 in two outputs 6a, 6b; where unexcited state is non-input delivered to the system); processing traction motor signal to create an indication result responsive to a frequency of traction motor signal; ( Column 3, lines 63 - Column 4, lines 13; Fig 1, primary frequency command generating means 20; alternating current command generating means 80, PWM signal generating means 90); and determining rotational velocity of traction motor based on indication result( See Fig 1, three phase alternating current motor 4, speed sensor 6, current sensor 7, accelerator sensor 8, rotating angular speed detecting means 10; Column 3, lines 30 -50; See Fig 2, 301,31,40,50, M/C; Column 5, lines 48-53 ).

Obara et al in view of Balch does not show motor signal is responsive to motor in an electrically unexcited state. Becerra shows motor signal is responsive to motor in an electrically unexcited state (Col 1, Introduction, where the sensor is utilized to measure the EMF voltage in motor unexcited phase).

It would have been obvious for one of ordinary skill in the art to provide the EMF voltage measurement, which exhibited in unexcited phase, as the feedback trigger signal as taught by Becerra, to Obara et al in view of Balch, to provide a rotational velocity detection method.

As for claim 30, Obara et al shows a computer data signal encoded in a computer readable medium, data signal comprising code configured to direct a computer to implement a process for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase(Column 3, lines 42- 47; Column 4, lines 18-22; Fig 1; Speed Sensor 6 which obtaining motor input signal which respond to motor 4 in two outputs 6a, 6b), wherein traction motor signal is responsive to an operating condition of traction motor (Column 3, lines 42- 47; Column 4, lines 18-22; Fig 1; Speed Sensor 6 which obtaining motor input signal which respond to motor 4 in two outputs 6a, 6b ); processing traction motor signal to create an indication result responsive to a frequency of traction motor signal( Column 3, lines 63 - Column 4, lines 13; Fig 1, primary frequency command generating means 20; alternating current command generating means 80, PWM signal generating means 90); and determining rotational velocity of traction motor based on indication result (See Fig 1, three phase alternating current motor 4, speed sensor 6, current sensor 7, accelerator sensor 8, rotating angular speed detecting means 10; Column 3, lines 30 -50; See Fig 2, 301,31,40,50, M/C; Column 5, lines 48-53 ).

Obara et al in view of Balch does not show motor signal is responsive to motor in an electrically unexcited state. Becerra shows motor signal is responsive to motor in an electrically unexcited state (Col 1, Introduction, where the sensor is utilized to measure the EMF voltage in motor unexcited phase).

It would have been obvious for one of ordinary skill in the art to provide the EMF voltage measurement, which exhibited in unexcited phase, as the feedback trigger signal as taught by Becerra, to Obara et al in view of Balch, to provide a rotational velocity detection method.

As for claim 31, Obara et al shows a computer processor on a vehicle for performing a process for detecting a rotational velocity of a traction motor in a vehicle comprising: obtaining a traction motor signal having at least one phase,(Column 3, lines 42- 47; Column 4, lines 18-22; Fig 1; Speed Sensor 6 which obtaining motor input signal which respond to motor 4 in two outputs 6a, 6b ) wherein traction motor signal is responsive to an operating condition of traction motor ( Column 3, lines 42- 47; Column 4, lines 18-22; Fig 1; Speed Sensor 6 which obtaining motor input signal which respond to motor 4 in two outputs 6a, 6b ); processing traction motor signal to create an indication result responsive to a frequency of traction motor signal( Column 3, lines 63 - Column 4, lines 13; Fig 1, primary frequency command generating means 20; alternating current command generating means 80, PWM signal generating means 90); and determining rotational velocity of traction motor based on indication result (See Fig 1, three phase alternating current motor 4, speed sensor 6, current sensor 7, accelerator sensor 8, rotating angular speed detecting means 10; Column 3, lines 30 -50; See Fig 2, 301,31,40,50, M/C; Column 5, lines 48-53 ).

Obara et al in view of Balch does not show motor signal is responsive to motor in an electrically unexcited state. Becerra shows motor signal is responsive to motor in an electrically unexcited state (Col 1, Introduction, where the sensor is utilized to measure the EMF voltage in motor unexcited phase).

It would have been obvious for one of ordinary skill in the art to provide the EMF voltage measurement, which exhibited in unexcited phase, as the feedback trigger signal as taught by Becerra, to Obara et al in view of Balch, to provide a rotational velocity detection method.

As for claim 32, Obara et al shows a system for detecting a rotational velocity of a traction motor in a vehicle comprising: a traction motor generating a traction motor signal having at least one phase ( Column 3, lines 42- 47; Column 4, lines 18-22; Fig 1; Speed Sensor 6 which obtaining motor input signal which respond to motor 4 in two outputs 6a, 6b ), wherein traction motor signal is responsive to an operating condition of traction motor ( Column 3, lines 42- 47; Column 4, lines 18-22; Fig 1; Speed Sensor 6 which obtaining motor input signal which respond to motor 4 in two outputs 6a, 6b ); a voltage sensor configured to generate a signal indicative a voltage generated by residual flux in traction motor when rotated by movement of vehicle with traction motor in an electrically unexcited state; (See Fig 1, three phase alternating current motor 4, speed sensor 6, current sensor 7, accelerator sensor 8, rotating angular speed detecting means 10; Column 4, lines 41 - Column 5, lines 35); and a controller in operable communication with at least one of traction motor and voltage sensor configured to process traction motor signal and signal, See Fig 1, three phase alternating current motor 4, speed sensor 6, current sensor 7, accelerator sensor 8, rotating angular speed detecting means 10; current control means 70; Column 5, lines 37- 53; Column 3, lines 30 -50 where the speed sensor and current , accelerator sensor are used to diagnostic and process the traction motor signal as the input to controller) and thereby create an indication result responsive to a frequency of traction motor signal and indicative of rotational velocity of traction motor (See Fig 1, three phase alternating current motor 4, speed sensor 6, current sensor 7, accelerator sensor 8, rotating angular speed detecting

means 10; current control means 70; Column 5, lines 37- 53; Column 3, lines 30 -50; See Fig 2, 301,31,40,50, M/C; Column 5, lines 48-53).

Obara et al in view of Balch does not show motor signal is responsive to motor in an electrically unexcited state. Becerra shows motor signal is responsive to motor in an electrically unexcited state (Col 1, Introduction, where the sensor is utilized to measure the EMF voltage in motor unexcited phase).

It would have been obvious for one of ordinary skill in the art to provide the EMF voltage measurement, which exhibited in unexcited phase, as the feedback trigger signal as taught by Becerra, to Obara et al in view of Balch, to provide a rotational velocity detection method.

9. Claims 3, 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Obara et al (US Pat NO. 5,661,380) in view of Becerra ( Four Quadrant Sensorless Brushless ECM Drive ; CH2992-6/91/0000-0202, IEEE) and further in view of Balch .

As for claim 3, Obara et al shows vehicle data signal includes a reference speed signal responsive to a rotational velocity of additional traction motor (See Fig 1, primary frequency command generating means 20, vector control calculating means 50, alternating current command generating means 80, PWM signal generating means 90 where provides reference feed back signal accordingly to the vehicle condition alone with standard signal Eu, Ev, Ew; column 3, lines 51 - column 4, lines 17). Obara et al in view of Becerra does not show the vehicle includes an additional traction motor.

Balch et al shows, vehicle includes an additional traction motor (Column 2, lines 9-10, Column 2, lines 35 -43).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by adding an additional motor in order to achieve determining a reference speed approximating a ground speed of a vehicle having a plurality of axles for the locomotive.

As for claim 4, Balch et al shows vehicle data signal includes a reference speed tolerance (Column 3, lines 27 - 37 where the minimum speed wheel slip is selected as the reference speed tolerance).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by adding the reference speed tolerance in order to eliminate cost and improve accuracy due to ground conditions and other environmental conditions.

10. Claims 16-20; 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Obara et al (US Pat NO 5,661,380) in view of Becerra (Four Quadrant Sensorless Brushless ECM Drive; CH2992-6/91/0000-0202, IEEE) and further in view of Kumar et al (US Pat NO 5,992,950).

As for claim 16, Kumar et al shows processing traction motor signal includes applying single phase of traction motor signal to a rectifier so as to create a rectified signal( See Fig 1, power rectifier 13; Column 3, lines 22- 47).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by adding rectification means of Kumar et al in order to obtain the magnitude of output current.

As for claim 17, Kumar et al shows processing traction motor signal includes applying rectified signal to a low pass filter so as to create an indication result responsive to the magnitude of single phase of traction motor signal (Column 3, lines 42-47; Column 4, lines 20-27).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by adding the lower frequency filter means of Kumar et al in order to minimizes transient voltage variants and stabilizes Direct Current voltage.

As for claim 18, Kumar et al shows processing traction motor signal includes processing single phase of traction motor signal so as to create indication result responsive to the magnitude of single phase of traction motor signal (Column 4, lines 7-26).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by create at least one phase of traction motor signal of Kumar et al as a reference signal in order to compare the feedback control loop system signal.

As for claim 19, Obara et al shows processing traction motor signal includes determining the time between predefined signal event occurrences so as to create an indication result responsive to the frequency of signal phase of traction motor signal (Column 3, lines 60 - Column 4, lines 17; Column 4, lines 41 - Column 5, lines 30).

As for claim 20, Kumar et al processing traction motor signal includes processing traction motor signal so as to create indication result responsive to the frequency of traction motor signal(Column 2, lines 34 - 55; Column 4, lines 8 - 26; Column 6, lines 23 -60).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by adding the motor signal frequency control means of Kumar et al in order to create desired responsive signal to traction motor signal in frequency

As for claim 22, Kumar et al shows processing traction motor signal includes obtaining a vehicle data signal and applying single phase of traction motor signal to a band pass filter so as to create a band pass output signal responsive to vehicle data signal(See Fig 3, Column 8, lines 13 - 30).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by adding the lead lag filter of Kumar et al in order to provide certain frequency operation range for the motor.

As for claim 23, Kumar et al shows processing traction motor signal includes applying band pass output signal to a signal rectifier so as to create a rectified signal (See Fig 1, Fig 3; Column 6, lines 62- Column 7, line 3; Column 4, lines 48-67 where prime mover 11 provides signal toward main alternator for power rectification).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by applying the process means of Kumar et al to apply the band pass signal to signal rectifier in order to utilize the band pass signal as a reference to compare with three phase motor signals in magnitude after rectification.

As for claim 24, Kumar et al shows processing traction motor signal includes applying rectified signal to a low pass filter so as to create indication result wherein indication result is

responsive to the magnitude and frequency of single phase of traction motor signal (Column 3, lines 42-47; Column 4, lines 20-27).

It would have been obvious to one of ordinary skill in the art to modify the control system and method of Obara et al by adding the lower frequency filter means and create responsive reference signal of Kumar et al in order to minimizes transient voltage variants and stabilizes Direct Current voltage and complete feedback loop reference signal.

11. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Obara et al (US Pat NO 5,661,380) in view of Becerra ( Four Quadrant Sensorless Brushless ECM Drive ; CH2992-6/91/0000-0202, IEEE) and further in view of Discenzo (US Pat No. 6,326,758).

As for claim 21, Obara et al in view of Becerra dos not show processing traction motor signal includes calculating indication result using Fourier analysis, wherein indication result is responsive to the magnitude and frequency spectrum of traction motor signal.

Discenzo shows processing traction motor signal includes calculating indication result using fourier analysis, wherein indication result is responsive to the magnitude and frequency spectrum of traction motor signal ( Column 6, lines 51 - 65; Column 14, lines 38 - 50; Column 9, lines 22 - 35 ).

It would have been obvious to one of ordinary skill in the art to modify the signal analysis method of Obara et al in view of Kumar et al by implementing the signal analysis method of Discenzo in order to advantageously utilize the outputs of the control system and to optimize the performance of control system.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wood et al (US Pat No. 5,290,095) shows a wheel lock detection system and sensor.

Mutoh et al (US Pat N0. 5,357,181) shows a motor failure detection system with Pulse width modulation control.

Kumar (US Pat No. 5,629,567) shows a control system with three phase motor with rectifier.

Yoshihara et al (US Pat No. 5,677,611) shows a control system with three phase motor with pulse width modulation control.

Ishikawa (US Pat No. 5,689,170) shows a control system with three phase motor with pulse width modulation control and sensor output detection comparison.

Akao (US Pat No. 5,739,649) shows a control system for failure check in ac three phase motor systems.

Kumar et al (US Pat No. 5,990,648) shows a control system for failure check in ac three phase motor systems.

Takatsuki et al (US Pat No. 6,054,827) shows a control system with motor output control, detection and conversion means.

Kushion (US Pat No. 6,271,637) shows a control system for failure check in ac three phase motor systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ian Jen whose telephone number is 571-270-3274. The examiner can normally be reached on Monday - Friday 8:00-5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Khoi Tran can be reached on 571-272-6916. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ian Jen/

Examiner, Art Unit 3664

/Khoi H Tran/

Supervisory Patent Examiner, Art Unit 3664